

What is claimed is:

1. A dielectric barrier discharge plasma cell, comprising:
a conductor adapted to receive an alternating current voltage; and
a dielectric spaced apart from said conductor, said dielectric comprising:
a dielectric substrate having a first surface nearer to said conductor and a second
5 surface, opposite said first surface and farther from said conductor; and
a uniform conductive coating on said second surface of said dielectric substrate,
adapted to receive an alternating current voltage;
wherein said cell is adapted to generate plasma in the space between said conductor and
said dielectric.

2. The dielectric barrier discharge plasma cell of claim 1 wherein said
dielectric and said conductor are uniformly spaced from one another.

3. The dielectric barrier discharge plasma cell of claim 1 further comprising a
transformer and wherein said alternating current voltage is raised from an input voltage to an
operational voltage by said transformer.

4. The dielectric barrier discharge plasma cell of claim 1 wherein said
conductor consists of a conductor substrate and a conductor coating layer.

5. The dielectric barrier discharge plasma cell of claim 4 wherein said
conductor substrate comprises an electrode.

6. The dielectric barrier discharge plasma cell of claim 4 wherein said
conductor substrate comprises stainless steel.

7. The dielectric barrier discharge plasma cell of claim 4 wherein said conductor substrate comprises aluminum.

8. The dielectric barrier discharge plasma cell of claim 4 wherein said conductor substrate comprises copper.

9. The dielectric barrier discharge plasma cell of claim 4 wherein said conductor coating layer comprises a catalyst.

10. The dielectric barrier discharge plasma cell of claim 9 wherein said catalyst comprises nickel.

11. The dielectric barrier discharge plasma cell of claim 1 further comprising a plurality of spacer elements for spacing said dielectric and said conductor.

12. The dielectric barrier discharge plasma cell of claim 1 further comprising a protective layer covering said conductive coating.

13. The dielectric barrier discharge plasma cell of claim 12 further comprising an adhesion layer between said conductive coating and said dielectric substrate.

14. The dielectric barrier discharge plasma cell of claim 13 wherein said adhesion layer comprises titanium.

15. The dielectric barrier discharge plasma cell of claim 13 wherein said adhesion layer comprises chromium.

16. The dielectric barrier discharge plasma cell of claim 13 wherein said adhesion layer is about 400 angstroms to about 600 angstroms in thickness.

17. The dielectric barrier discharge plasma cell of claim 13 wherein said adhesion layer is sputter coated onto said dielectric substrate.

18. The dielectric barrier discharge plasma cell of claim 1 wherein said conductive coating comprises copper.

19. The dielectric barrier discharge plasma cell of claim 1 wherein said conductive coating is about 25 microns to 100 microns in thickness.

20. The dielectric barrier discharge plasma cell of claim 13 wherein said conductive coating is sputter coated onto said adhesion layer.

21. The dielectric barrier discharge plasma cell of claim 13 wherein said conductive coating is sputter coated onto said adhesion layer for about 2000 angstroms in thickness and then plated onto said adhesion layer.

22. The dielectric barrier discharge plasma cell of claim 12 wherein said protective layer comprises nickel.

23. The dielectric barrier discharge plasma cell of claim 12 wherein said protective layer comprises a tin based solder alloy.

24. The dielectric barrier discharge plasma cell of claim 12 wherein said protective layer is about 25 microns to about 100 microns in thickness.

25. The dielectric barrier discharge plasma cell of claim 12 wherein said protective layer is plated onto said conductive coating.

26. The dielectric barrier discharge plasma cell of claim 1 wherein said second surface of said dielectric substrate is treated such that said conductive coating adheres thereto.

27. The dielectric barrier discharge plasma cell of claim 26 wherein said second surface of said dielectric substrate is sand blasted.

28. The dielectric barrier discharge plasma cell of claim 26 wherein said second surface of said dielectric substrate is ground.

29. The dielectric barrier discharge plasma cell of claim 2 wherein said dielectric and said conductor are arranged as parallel plates.

30. The dielectric barrier discharge plasma cell of claim 29 wherein said dielectric and said conductor are corrugated.

31. The dielectric barrier discharge plasma cell of claim 1 wherein said dielectric is cylindrical.

32. The dielectric barrier discharge plasma cell of claim 31 wherein said conductor is coaxial with said dielectric.

33. The dielectric barrier discharge plasma cell of claim 31 wherein said conductor comprises at least one cork screw shaped element.

34. The dielectric barrier discharge plasma cell of claim 33 wherein said cork screw shaped element comprises a thin electrode.

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35. A dielectric barrier discharge plasma system, comprising:
a plurality of dielectric barrier discharge plasma cells,
wherein each of said dielectric barrier discharge plasma cells comprises:
a conductor adapted to receive an alternating current voltage; and
5 a dielectric spaced apart from said conductor, said dielectric comprising:
a dielectric substrate having a first surface nearer to said conductor and a
second surface, opposite said first surface and farther from said conductor; and
a uniform conductive coating on said second surface of said dielectric
substrate, adapted to receive an alternating current voltage; and
10 wherein said cells are adapted to generate plasma in the space between said conductor
and said dielectric; and
wherein said plurality of dielectric barrier discharge plasma cells are arranged radially.

36. A dielectric barrier discharge plasma system, comprising:
a plurality of dielectric barrier discharge plasma cells,
wherein each of said dielectric barrier discharge plasma cells comprises:
a conductor adapted to receive an alternating current voltage; and
a dielectric spaced apart from said conductor, said dielectric comprising:
a dielectric substrate having a first surface nearer to said conductor and a
second surface, opposite said first surface and farther from said conductor; and
a uniform conductive coating on said second surface of said dielectric
substrate, adapted to receive an alternating current voltage; and
10 wherein said cells are adapted to generate plasma in the space between said conductor
and said dielectric; and
wherein said plurality of dielectric barrier discharge plasma cells are stacked.